

IN THE CLAIMS

1. (Currently amended) A magnetic head actuator having a finely movable tracking device comprising:

a swing arm extending in a first plane and having a magnetic head at a free end and reciprocally movable around a coarse rotation axis at a base of the swing arm, the swing arm having an opening therein,

wherein the opening is defined by edges extending in a second plane substantially perpendicular to the first plane;

a piezoelectric element having opposed edges and suspended between two sections within the opening of the swing arm, such that the opposed edges are parallel with the edges of the opening;

~~by an~~ a non-shrinkable adhesive contacting the opposed edges of the piezoelectric element and corresponding edges of the opening, the piezoelectric element having a voltage-impressing electrode for allowing a fine arcuate movement of the free end around the coarse rotation axis in response to an applied voltage;

an FPC board having a resin base and a feeding line embedded in the resin base for feeding power to the voltage-impressing electrode,

wherein a portion of the resin base is removed to expose a portion of the feeding line that extends onto the electrode; and

a direct physical connection between the feeding line and the voltage impressing electrode at the exposed portion of the feeding line.

2. (Previously amended) The magnetic head actuator according to Claim 1, wherein the direct physical connection comprises an ultrasonic bond, wherein a portion of the material of the feeding line resides in the voltage impressing electrode.

3. (Previously amended) The magnetic head actuator according to Claim 1, wherein the direct physical connection comprises an Au ball bond.

4. (Previously amended) The magnetic head actuator according to Claim 1, wherein the direct physical connection comprises a through-hole in the exposed portion of

feeding line that is electrically connected to the voltage-impressing electrode by a gold ball positioned in the through-hole.

5. (Previously amended) The magnetic head actuator according to Claim 1, wherein the direct physical connection comprises a stud bump made of conductive material residing on the piezoelectric element, and wherein the exposed portion of the feeding line is electrically connected to the voltage-impressing electrode by a stud bump positioned in a through-hole located in the exposed portion of the feeding line.

6. (Original) The magnetic head actuator according to Claim 1 further comprising a pair of piezoelectric elements having polarities opposite to each other.

7. (Original) The magnetic head actuator according to Claim 1, further comprising a trace line leading to the magnetic head and extending, together with the feeding line, in the FPC board.

8. (Currently amended) A magnetic head actuator having a finely movable tracking device comprising:

a swing arm extending in a first plane and having a magnetic head at a free end and reciprocally movable around a coarse rotation axis at a base of a base of the swing arm, the swing arm having an opening therein,

wherein the opening is defined by edges extending in a second plane substantially perpendicular to the first plane;

a piezoelectric element having opposed edges and suspended between two sections within the opening of the swing arm such that the opposed edges are parallel with the edges of the opening;

by an a non-shrinkable adhesive contacting the opposed edges of the piezoelectric element and corresponding edges of the opening, the piezoelectric element having a voltage-impressing electrode for allowing a fine arcuate movement of the free end around the coarse rotation axis when a voltage is applied; and

an FPC board having a resin base and a feeding line embedded in the resin base for feeding power to the voltage-impressing electrode,

wherein the feeding line resides completely within the FPC board except for an exposed portion extending onto the voltage impressing electrode, and wherein the exposed portion is bonded to the piezoelectric element by a direct physical connection between the voltage-impressing electrode and the exposed portion.

9. (Currently amended) The magnetic head actuator according to Claim 8; wherein the ~~direct~~ direct physical connection comprises an ultrasonic bond, wherein a portion of the material of the feeding line resides in the voltage impressing electrode.

10. (Currently amended) The magnetic head actuator according to Claim 8, wherein the ~~direct~~ direct physical connection comprises an Au ball bond.

11. (Previously amended) The magnetic head actuator according to Claim 8, wherein the direct physical connection comprises a through-hole in the exposed portion of the feeding line that is electrically connected to the voltage-impressing electrode by a gold ball positioned in the through-hole.

12. (Previously amended) The magnetic head actuator according to Claim 8, wherein the direct physical connection comprises a stud bump made of a conductive material residing on the piezoelectric element, and wherein the exposed portion of the feeding line is electrically connected to the voltage-impressing electrode by a stud bump positioned in a through-hole located in the exposed portion of the feeding line.

13. (Original) The magnetic head actuator according to Claim 8 further comprising a pair of piezoelectric elements having polarities opposite to each other.

14. (Original) The magnetic head actuator according to Claim 8, further comprising a trace line leading to the magnetic head and extending, together with the feeding line, in the FPC board.

15. (New) A magnetic head actuator having a finely movable tracking device comprising:

a swing arm extending in a first plane and having a magnetic head at a free end and reciprocally movable around a coarse rotation axis at a base end of the swing arm;

a flexible section connecting the free end with the base end, the flexible section having outwardly extending bends and first and second openings therein,

wherein the first and second openings are defined by edges extending in a second plane substantially perpendicular to the first plane;

first and second piezoelectric elements, each having opposed edges and suspended within the first and second openings, respectively, such that the opposed edges of each piezoelectric element are parallel with the edges of the opening;

a non-shrinkable adhesive contacting the opposed edges of the first and second piezoelectric elements and corresponding edges of the first and second openings, each of the first and second piezoelectric elements having a voltage-impressing electrode on a first face for allowing a fine arcuate movement of the free end around the coarse rotation axis in response to an applied voltage, and a ground electrode on an opposite face;

an FPC board having a resin base and a feeding line embedded in the resin base for feeding power to the voltage-impressing electrode,

wherein a portion of the resin base is removed to expose a portion of the feeding line that extends onto the electrode; and

a direct physical connection between the feeding line and the voltage impressing electrode at the exposed portion of the feeding line.

16. (New) The magnetic head actuator according to Claim 15, wherein the base end, flexible section, and free end are configured such that about a one micrometer contraction of the first or second piezoelectric elements creates about a ten micrometer arcuate movement about the coarse axis.

17. (New) The magnetic head actuator according to Claim 15, wherein the FPC board is mounted to a surface of the swing arm and spans at least one of the first and second openings in the swing arm, and wherein the piezoelectric element is disposed in the opening, such that the piezoelectric element does not protrude above the surface of the swing arm.

18. (New) The magnetic head actuator according to Claim 1, wherein the FPC board is mounted to a surface of the swing arm and spans the opening in the swing arm, and wherein the piezoelectric element is disposed in the opening, such that the piezoelectric element does not protrude above the surface of the swing arm.

19. (New) The magnetic head actuator according to Claim 8, wherein the FPC board is mounted to a surface of the swing arm and spans the opening in the swing arm, and wherein the piezoelectric element is disposed in the opening, such that the piezoelectric element does not protrude above the surface of the swing arm.

20. (New) A magnetic head actuator having a finely movable tracking device comprising:

- a swing arm having a magnetic head at a free end and reciprocally movable around a coarse rotation axis at a base of the swing arm, the swing arm having an opening therein,

- a piezoelectric element suspended within the opening of the swing arm, the piezoelectric element having a voltage-impressing electrode for allowing a fine arcuate movement of the free end around the coarse rotation axis in response to an applied voltage;

- an FPC board mounted to a surface of the swing arm and spanning the opening, the FPC board having a resin base and a feeding line embedded in the resin base for feeding power to the voltage-impressing electrode,

- wherein a portion of the resin base is removed to expose a portion of the feeding line that extends onto the electrode, and

- wherein the piezoelectric element is disposed within the opening, such that the piezoelectric element does not protrude above the surface of the swing arm; and

- a direct physical connection between the feeding line and the voltage impressing electrode at the exposed portion of the feeding line.